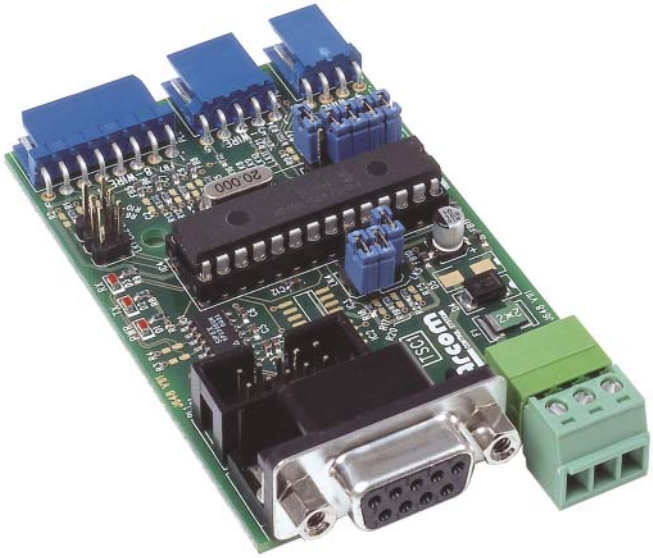
# TSC1

**Analog Resistive Touchscreen Controller**

**Technical Manual**



Arcom

Think Embedded. Think Arcom.

#### Definitions

Arcom is the trading name for Arcom Control Systems Inc and Arcom Control Systems Ltd.

#### Disclaimer

The information in this manual has been carefully checked and is believed to be accurate. Arcom assumes no responsibility for any infringements of patents or other rights of third parties, which may result from its use.

Arcom assumes no responsibility for any inaccuracies that may be contained in this document. Arcom makes no commitment to update or keep current the information contained in this manual.

Arcom reserves the right to make improvements to this document and/or product at any time and without notice.

#### Warranty

This product is supplied with a full 3 year warranty. Product warranty covers failure caused by any manufacturing defects. Arcom will make all reasonable effort to repair the product or replace it with an identical variant. Arcom reserves the right to replace the returned product with an alternative variant or an equivalent fit, form and functional product. Delivery charges will apply to all returned products. Please go to www.arcom.com/support for information about product return forms.

#### Trademarks

Windows 98, Windows NT, Windows 2000 and Windows XP are trademarks or registered trademarks of the Microsoft Corporation.
Dubox™ is a trademark of Framatome Connectors International.
3M™ and Dynapro™ are trademarks of 3M Limited.
All other trademarks recognized.

#### Revision history

| *Manual* | *PCB* | *Date* | *Comments* |
|---|---|---|---|
| Issue A | V1I1 | 8th Nov 2001 | First release of manual. |
| Issue B | V1I2 | 11th July 2002 | Connector pinouts changed on V1 Iss2 boards. |
| Issue C | V1I2 mod A | 24th June 2003 | 10-bit Operation option added |
| Issue D | V1I2 mod A | 23rd July 2003 | Jumper setting correction for 5-wire interface |
| Issue E | V1I2 mod C | 9th May 2005 | Jumper LK4 operation added |

© 2006 Arcom.
Arcom is a subsidiary of Eurotech Group.
www.eurotech.com
For contact details, see page 28.

Arcom operates a company-wide quality management system which has been certified by the British Standards Institution (BSI) as compliant with ISO9001:2000

# Contents

Introduction ....4
Handling your board safely ....4
TSC1 touchscreen controller ‘at a glance’ ....5
Features of the TSC1 ....6
About this manual ....7
Conventions ....7
Jumpers and connectors ....8
Jumpers ....9
Connectors ....16
PL3 - Serial port ....16
PL1 - Alternative serial port ....17
PL5 - Power input ....17
PL2 - 8-wire touchscreen interface ....18
PL4 - 5-wire touchscreen interface ....18
PL6 - 4-wire touchscreen interface ....19
Using the TSC1 ....20
Serial interface port ....20
Touchscreen interface ....20
Modes of operation ....21
LEDs ....22
Software drivers ....23
Temperature issues ....25
Interference due to RF emissions ....26
Power supply ....27
Power input ....27
Appendix A – Contacting Arcom ....28
Appendix B – Compatible touchscreens ....29
Appendix C – Dimensional information ....30
Appendix D – Reference information ....31
Appendix E – Acronyms and abbreviations ....32
Index ....33

© 2005 Arcom Issue E

# Introduction

The TSC1 is an analog resistive touchscreen controller board. It serves as an interface between 4, 5 or 8-wire resistive touchscreens and an Arcom single board computer via one of its serial ports.

For information about ordering boards, please contact a member of the Arcom sales team. See Appendix A – Contacting Arcom, page 28.

## Handling your board safely

### *Anti-static handling*

This board contains CMOS devices that could be damaged in the event of static electricity being discharged through them. At all times, please observe anti-static precautions when handling the board. Always unpack and install it in an anti-static working area.

### *Packaging*

Should a board need to be returned to Arcom, please ensure that it is adequately packed, preferably in the original packing material.

Use an anti-static bag for the board and use a box (rather than a bag) to physically protect the board.

An anti-static bag is not required if the board is being returned in the original Development Kit box, which has an anti-static foam interior.

Damage caused in transit may invalidate a warranty claim.

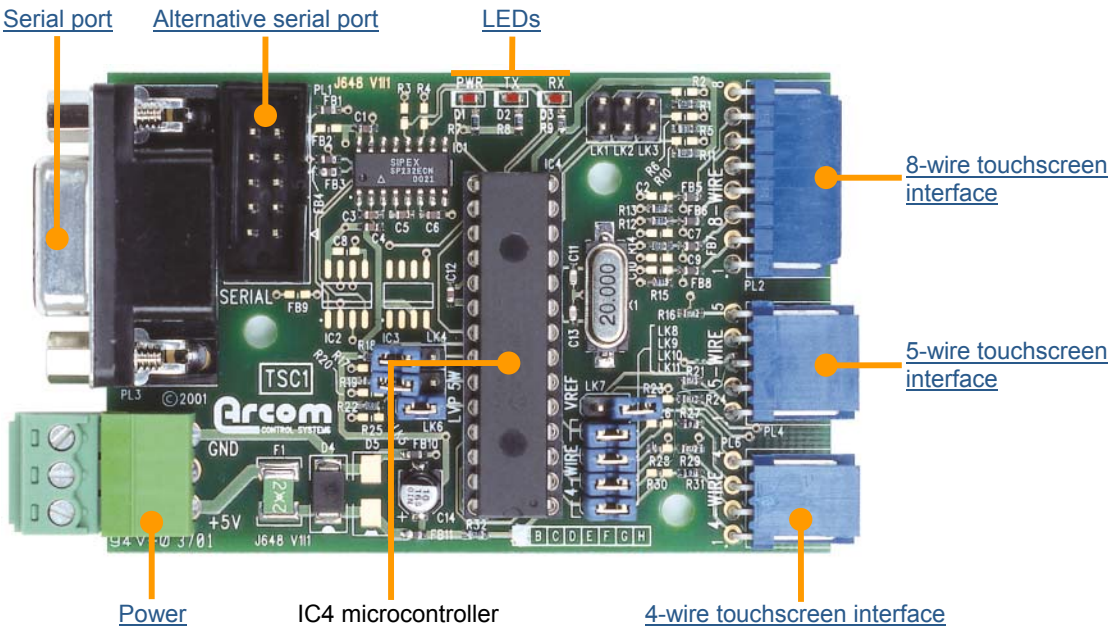
### *Electromagnetic compatibility (EMC)*

The TSC1 is classified as a component with regard to the European Community EMC regulations. It is the user's responsibility to ensure that systems using the board are compliant with the appropriate EMC standards.

Arcom EMC tests of the TSC1 have shown that the RF emissions of the board are well below standard international EMC limits and that it is unlikely to contribute significantly to the RF emissions spectrum of any system in which it is used.

© 2005 Arcom Issue E

# TSC1 touchscreen controller ‘at a glance’



## Features of the TSC1

The features included in the TSC1 are described below.

### *Interfaces*

- Link selectable interface to 4, 5 or 8-wire resistive touchscreens.
- RS232 interface to single board computer (4800 or 19200 baud).
- Optional RS485 interface variant for long distance communication. (Contact the Arcom sales team for further details; see page 28).
- 10-bit A/D (selectable 8-bit or 10-bit output to single board computer).

### *Operation mode*

- Operates in continuous touch mode.

### *LEDs*

- Power and valid-touch LEDs.

### *Power*

- 5V DC power input.
- Power consumption typically 35mA @ 5V DC.

### *Temperature*

- 0°C to +60°C (32°F to 140°F) operating temperature range.
- -20°C to +85°C (-4°F to 185°F) storage temperature range.

### *MTBF*

- 743,000 hours; calculated using generic figures from MIL-HDBK-217F at ground benign.

© 2005 Arcom Issue E

# About this manual

This manual describes the operation and use of the TSC1. It is designed to be a reference and user manual and includes information about all aspects of the board.

## Conventions

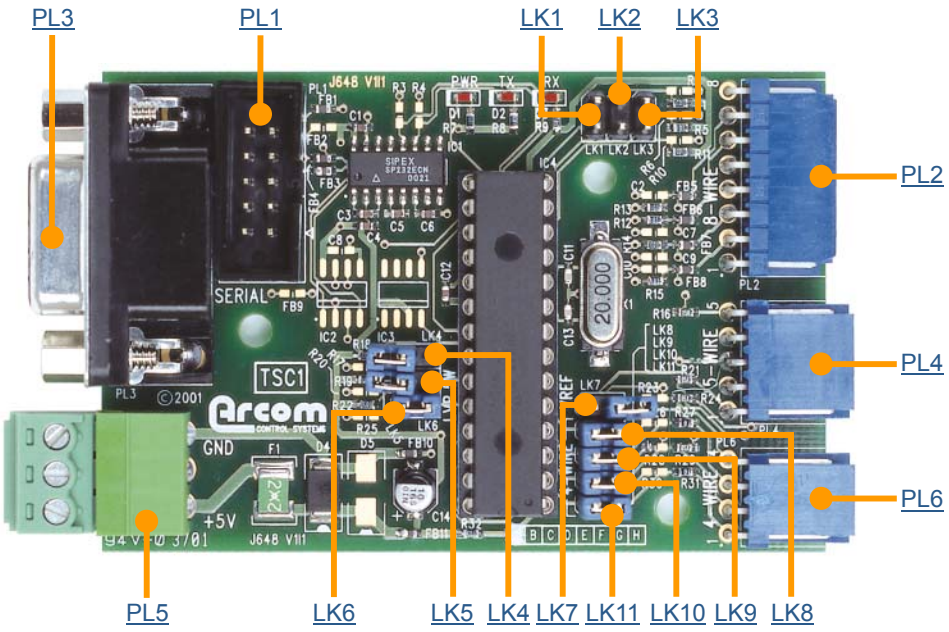
### *Symbols*

The following symbols are used in this guide:

| Symbol | Explanation |
|---|---|
| | Note - information that requires your attention. |
| | Tip - a handy hint that may provide a useful alternative or save time. |
| | Caution – proceeding with a course of action may damage your equipment or result in loss of data. |
| | Jumper is fitted. |
| | Jumper is not fitted. |

# Jumpers and connectors

The following diagram shows the jumpers and connectors on the TSC1. Click on any jumper or connector name for more information.



## Jumpers

There are 11 user-selectable jumpers on the TSC1. They are summarised in the following table:

| Jumper | Description | See... |
|---|---|---|
| LK1 | Reserved. Do not fit. | Page 9. |
| LK2 | 10-bit output select. | Page 9. |
| LK3 | Baud select. | Page 10. |
| LK4 | 8-wire panel option. | Page 10. |
| LK5 | 5-wire panel select. | Page 11. |
| LK6 | Low voltage programming. | Page 11. |
| LK7 | 5-wire voltage reference input. | Page 11. |
| LK8 | 4-wire resistive touchscreen interface. | Page 12. |
| LK9 | 5-wire voltage reference input and 4-wire resistive touchscreen interface. | Page 12. |
| LK10 | 4-wire resistive touchscreen interface. | Page 12. |
| LK11 | 4-wire resistive touchscreen interface. | Page 12. |

### *Reserved jumper - LK1*

This jumper is unused. Do not fit.

Default setting:

### *10-bit output select - LK2*

This jumper can be used to enable 10-bit output from the TSC1.

The host SBC must use compatible 10-bit driver software.

| LK2 | Description |
|---|---|
| | Enable 10-bit output from TSC1. |
| | TSC1 output is 8-bit only. |

Default setting:

### *Baud select - LK3*

This jumper can be used to change the baud rate from 4800 to 19200.

You should normally use 19200 when running in 10-bit mode and 4800 baud when running in 8-bit mode.

| LK3 | Description |
|---|---|
| | 19200 baud. |
| | 4800 baud. |

Default setting:

### *8-wire panel option - LK4*

Some large 8-wire panels may have valid touches at the extreme edges of the panel that are not detected as valid touches by the TSC1. You can fit this jumper to extend the range of valid inputs for 4 and 8-wire operation.

This jumper is not fitted for normal operation.

| LK4 | Description |
|---|---|
| | Range of valid inputs extended. |
| | Standard input range. |

Default setting:

### *5-wire panel select - LK5*

This jumper must be fitted when interfacing to 5-wire resistive touchscreens. See also jumpers LK7 and LK9, below.

| LK5 | Description |
|---|---|
| | When interfacing with 5-wire resistive touchscreens. |
| | When interfacing with 4 or 8-wire resistive touchscreens. |

Default setting:

### *Low voltage programming - LK6*

This jumper is for factory use only and is fitted when your TSC1 is supplied. Do not remove.

Default setting:

### *5-wire voltage reference inputs - LK7, LK9*

Fit these jumpers when interfacing to 5-wire resistive touchscreens. These jumpers are also fitted when interfacing to 4-wire touchscreens (see 4-wire interface jumper settings, below).

| LK7 | Description |
|---|---|
| | When interfacing with 5-wire (and 4-wire) resistive touchscreens. |
| | When interfacing with 8-wire resistive touchscreens. |

Default setting:

| LK9 | Description |
|---|---|
| | When interfacing with 5-wire (and 4-wire) resistive touchscreens. |
| | When interfacing with 8-wire resistive touchscreens. |

Default setting:

© 2005 Arcom Issue E

### *4-wire interface - LK8, LK9, LK10 and LK11*

These jumpers are used when interfacing with 4- and 8-wire resistive touchscreens. They must be fitted when interfacing to 4-wire resistive touchscreens, and removed when using 8-wire touchscreens.

| LK8 | Description |
|---|---|
| | Interface with 4-wire resistive touchscreen. |
| | Interface with 8-wire resistive touchscreen. |

Default setting:

| LK9 | Description |
|---|---|
| | Interface with 4-wire resistive touchscreen. |
| | Interface with 8-wire resistive touchscreen. |

Default setting:

| LK10 | Description |
|---|---|
| | Interface with 4-wire resistive touchscreen. |
| | Interface with 8-wire resistive touchscreen. |

Default setting:

| LK11 | Description |
|---|---|
| | Interface with 4-wire resistive touchscreen. |
| | Interface with 8-wire resistive touchscreen. |

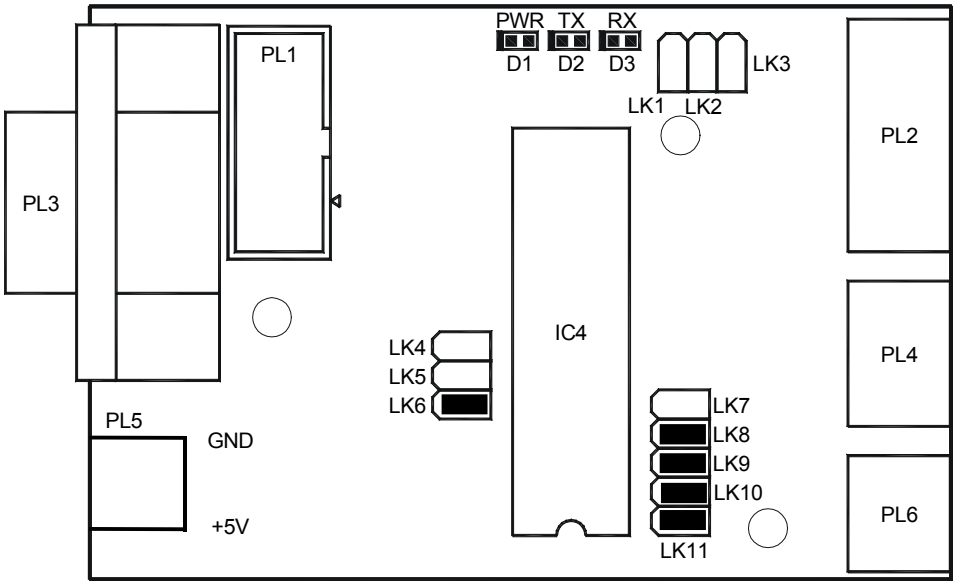
Default setting:

© 2005 Arcom Issue E

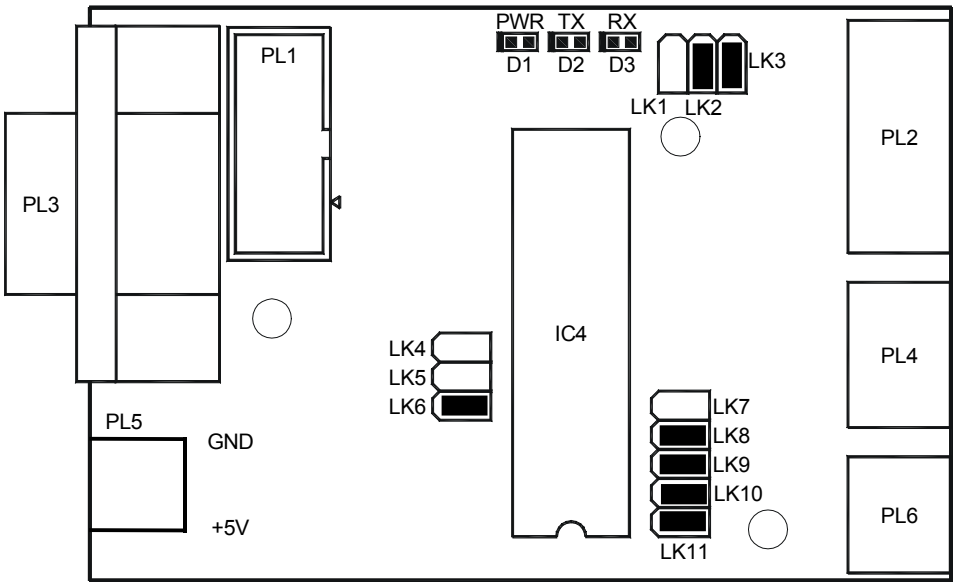
### *Jumper settings*

The following diagrams illustrate the TSC1 jumper settings required for the interfaces and output modes you might use.

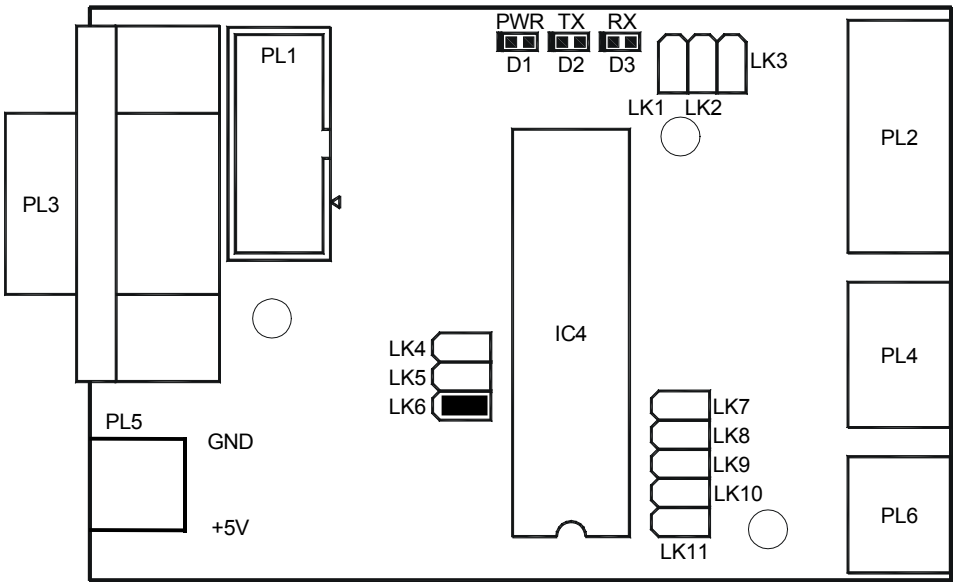
*4-wire interface, 8-bit output mode (factory default)*



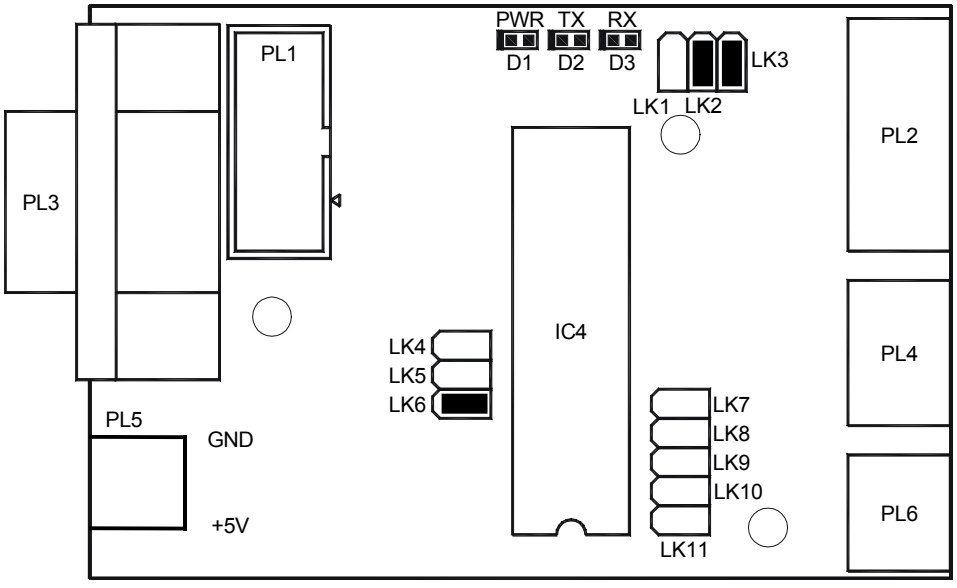

*4-wire interface, 10-bit output mode*



*8-wire interface, 8-bit output mode*

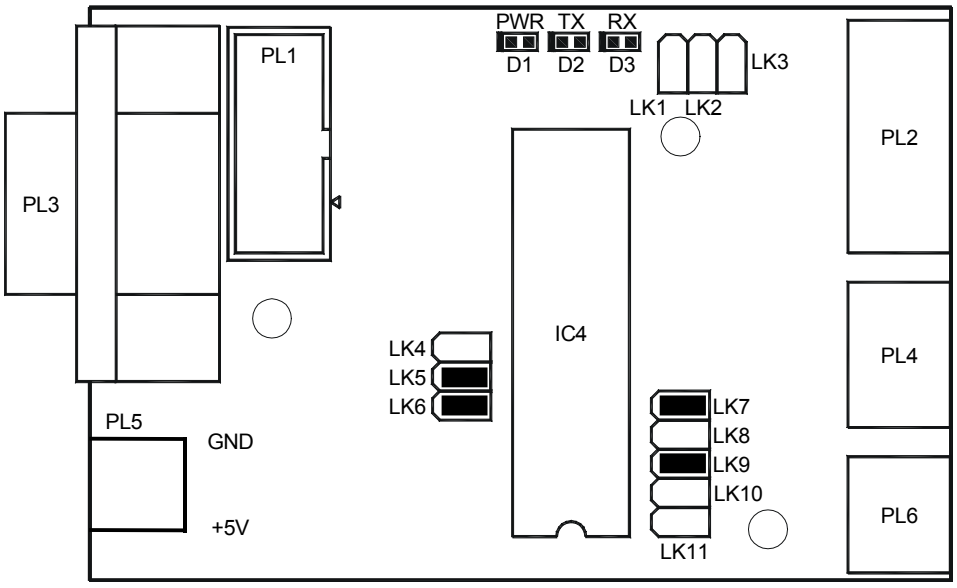



*8-wire interface, 10-bit output mode*

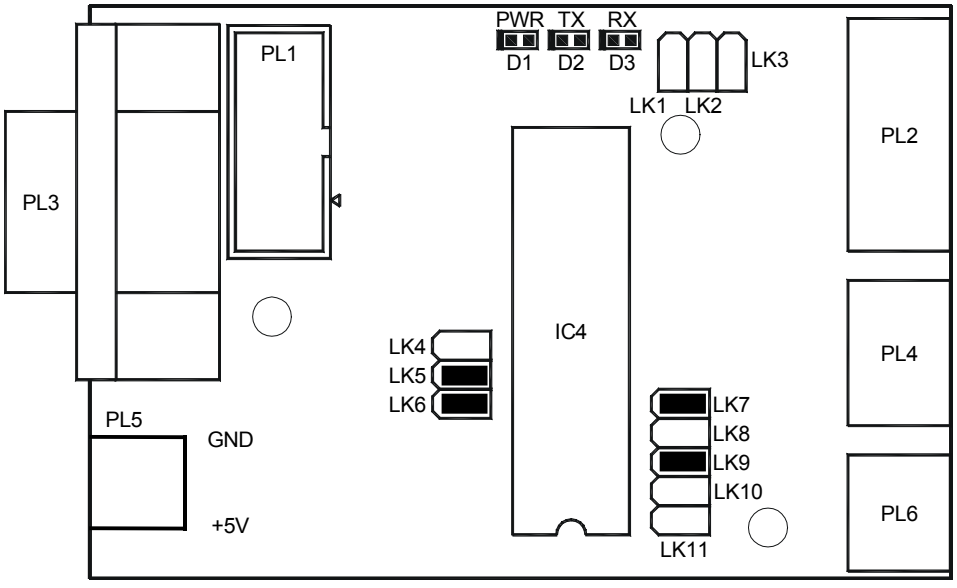



© 2005 Arcom Issue E

*5-wire interface, 8-bit output mode*




*5-wire interface, 10-bit output mode*



## Connectors

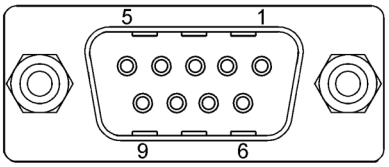
There are 6 connectors on the TSC1.

| Connector | Function | See ... |
|---|---|---|
| PL3 | Serial port. | Page 16. |
| PL1 | Alternative serial port. | Page 17. |
| PL5 | Power input. | Page 17. |
| PL2 | 8-wire touchscreen interface. | Page 18. |
| PL4 | 5-wire touchscreen interface. | Page 18. |
| PL6 | 4-wire touchscreen interface. | Page 19. |

## PL3 - Serial port

9-way D-type female connector.

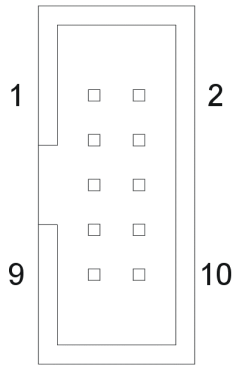
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | Not connected | 6 | Not connected |
| 2 | TX to SBC | 7 | Not connected |
| 3 | RX (unused) | 8 | Reserved |
| 4 | Not connected | 9 | Reserved |
| 5 | GND (0V) | | |



## PL1 - Alternative serial port

10-way 0.1" IDC boxed header.

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | Not connected | 2 | Not connected |
| 3 | TX to SBC | 4 | Not connected |
| 5 | RX (unused) | 6 | Reserved |
| 7 | Not connected | 8 | Reserved |
| 9 | GND (0V) | 10 | Not connected |

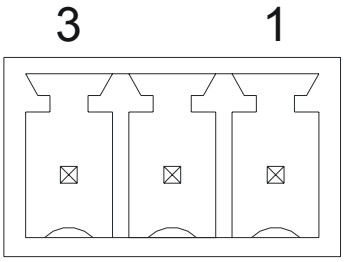



## PL5 - Power input

3-way 2-part Phoenix connector.

The TSC1 is supplied with the mating 3-way connector.

| Pin | Signal |
|---|---|
| 1 | +5V DC |
| 2 | GND |
| 3 | GND |

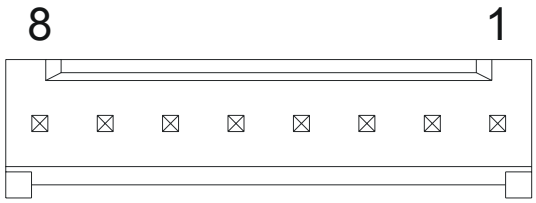


## PL2 - 8-wire touchscreen interface

8-way right-angled 0.1" Dubox type.

Suitable mating part: Dubox (FCI) housing 65240-008, crimps 76357-401.

| Pin | Signal name |
|---|---|
| 1 | Te (Top Excite) |
| 2 | Ts (Top Sense) |
| 3 | Bs (Bottom Sense) |
| 4 | Be (Bottom Excite) |
| 5 | Le (Left Excite) |
| 6 | Ls (Left Sense) |
| 7 | Rs (Right Sense) |
| 8 | Re (Right Excite) |

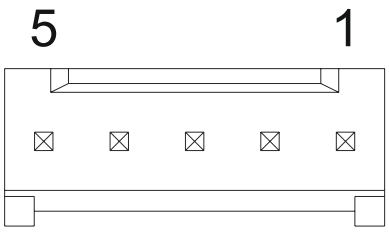



## PL4 - 5-wire touchscreen interface

5-way right-angled 0.1" Dubox type.

Suitable mating part: Dubox (FCI) housing 65240-005, crimps 76357-401.

| Pin | Signal name |
|---|---|
| 1 | H (Top Right) |
| 2 | X (Bottom Right) |
| 3 | S (Sense) |
| 4 | Y (Top Left) |
| 5 | L (Bottom Left) |



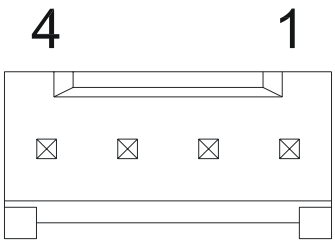

© 2005 Arcom Issue E

## PL6 - 4-wire touchscreen interface

4-way right-angled 0.1" Dubox type.

Suitable mating part: Dubox (FCI) housing 65240-004, crimps 76357-401.

| Pin | Signal name |
|---|---|
| 1 | Y+ (Top) |
| 2 | Y- (Bottom) |
| 3 | X+ (Right) |
| 4 | X- (Left) |




© 2005 Arcom Issue E

# Using the TSC1

## Serial interface port

The TSC1 serial port is a standard RS232 serial interface. PL3 should be connected to a standard PC RS232 serial communications port, either directly, or via a serial port extender cable (i.e. a straight through connection of pins 2, 3 and 5).

Do not use a null-modem crossover cable. The RS232 interface cable must not be longer than 3m.

Only the transmit (TX) and receive (RX) signal lines (and ground) are used. Neither the RS232 modem (hardware) handshaking signals nor software handshaking (Xon/Xoff) are used.

As an alternative to PL3, the 10-way header connector (PL1) can be used instead. The pin-out for this has been designed for connection via a straight pin-to-pin 10-way ribbon cable to a 10-way header serial port connector used on many Arcom single board computers.

## Touchscreen interface

The TSC1 is connected to your resistive touchscreen via one of the Dubox style connectors - PL2, PL4 or PL6.

| Touchscreen type | Use connector | See… |
|---|---|---|
| 4-wire | PL6 | Page 19. |
| 5-wire | PL4 | Page 18. |
| 8-wire | PL2 | Page 18. |

The pin-out and style of these connectors has been chosen to connect directly to many of the more common touchscreen panels. However, you should check the pin-out of the touchscreen you are using with the pin-out of the TSC1 connector (see Connectors, page 16). An interface cable may be required to correctly connect the TSC1 with your touchscreen.

A resistive touchscreen controller works by driving a potential difference across two sides of the touch panel and then measuring the resulting voltage on another of the panel wires when a touch is made. The TSC1 has been successfully tested with unshielded ribbon cables up to 1.5m long between the TSC1 and the touchscreen. We recommend, however, that any interface cable is kept as short as possible. This is particularly important in areas of high RF emissions, which may induce noise onto the touchscreen interface cable, resulting in an unstable or inaccurately reported touch position.

## Modes of operation

### *Touch mode*

The TSC1 board currently only supports continuous touch mode. Whenever a valid touch is detected on the touchscreen, the coordinates are passed to the processor board. If the touch is continuous, the TSC1 continually transmits a stream of touch coordinate data to the processor board until no touch is detected.

### *Output mode (8-bit or 10-bit)*

The TSC1 uses a 10-bit A/D converter. It can, however, output with either 8-bit resolution or 10-bit resolution.

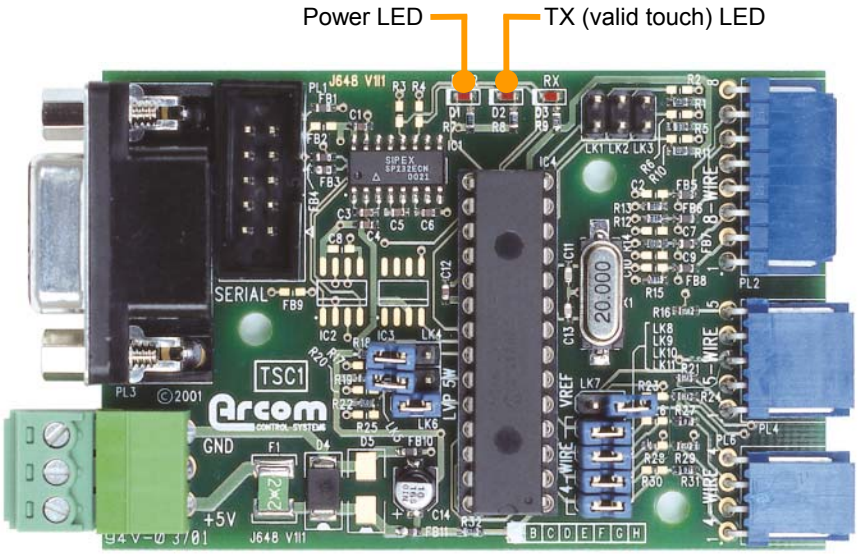
8-bit output mode is used when using the TSC1 with a single board computer (or PC) running with legacy or third party 8-bit driver software (and communicating at 4800 baud). Earlier TSC1 boards (V1I1 boards, or V1I2 boards without MOD status box ‘A’ marked) only ran in 8-bit mode. There are also a number of third party drivers available that are compatible with the TSC1 running in 8-bit mode (see Software drivers on page 23).

10-bit output is the preferred mode of operation. The performance of the TSC1 is greatly improved when running in 10-bit mode. Links LK2 and LK3 should be set to select 10-bit output at 19200 baud. See Jumpers on page 9 for more information. The Arcom 10-bit drivers must be used when running in this mode.

The TSC1 determines whether it should run in 8-bit or 10-bit mode only upon a hardware reset. If changing link LK2 or LK3 the board must be reset to ensure correct operation.

## LEDs

The position of the LEDs on the TSC1 is shown in the following picture:




Each LED is described in more detail below.

### *Power LED*

The PWR LED, D1, demonstrates that the board is correctly powered and that the on-board microcontroller program is running.

### *Transmit active*

The TX LED, D2, illuminates whenever there is a valid touch on the touchscreen panel.

### *Receive active*

The RX LED, D3, is currently unused and reserved for future development.

## Software drivers

### *8-bit drivers*

The board is designed to operate with Arcom or Touch-Base touchscreen drivers. Output from the board is at 4800 baud and in the configuration:

- X position (1byte).
- Y position (1byte).
- Y position again (1byte).

Arcom drivers are available for various operating systems, including:

- Microsoft Windows CE (v3.0 and .Net).
- Windows 98/2000/XP.
- XP Embedded.
- Arcom Embedded Linux.

You may use any Arcom supplied driver with the TSC1. These drivers are available from the Arcom website, at www.arcom.com.

The Arcom drivers must not be used with non-Arcom supplied hardware without the prior permission of Arcom.

Drivers for Microsoft Windows 95/98, Windows NT, Windows 2000 and DOS 6.22 are available from Touch-Base Ltd. Information about these drivers and some evaluation software can be found on the Touch-Base website, at www.touch-base.com. Please contact Touch-Base for information and licensing arrangements.

### *10-bit drivers*

When the TSC1 is set for 10-bit output, it must be used with a suitable Arcom 10-bit driver. Arcom drivers are available for:

- Microsoft Windows CE (v3.0 and .Net).
- Windows 98/2000/XP.
- XP Embedded.
- Arcom Embedded Linux.

© 2005 Arcom Issue E

These drivers are available from the Arcom website, at www.arcom.com. They expect output from the TSC1 at 19200 baud.

Output from the board is in the configuration:

- X coordinate LSB (least significant byte).
- X coordinate MSB (most significant byte).
- Y coordinate LSB.
- Y coordinate MSB.
- Y coordinate LSB.
- Y coordinate MSB.

### *General software driver information*

Once the software driver has been installed on your processor board or PC, the touchscreen/touchscreen controller must be calibrated.

Instructions for installing the drivers and for calibrating the touchscreen are included with the Arcom supplied drivers.

The calibration data is stored on the PC (or single board computer) that is running the software driver. If the touchscreen or touchscreen controller used is changed, the calibration procedure must be repeated.

For an explanation of calibration issues with respect to temperature, see Operation over a wide temperature range, on the following page.

There may be a small difference in the reported position of a touch for a short period after the TSC1 is switched on, while the TSC1 microcontroller reaches its operating temperature.

## Temperature issues

The TSC1 has been designed and tested to operate over a temperature range of 0°C to 60°C (32°F to 140°F). This is a wider range than the effective operating range of most resistive touchscreen panels.

The storage temperature range of the TSC1 is -20°C to +85°C (-4°F to 185°F).

### *Operation below 0°C*

Tests conducted at Arcom have found that many analog resistive touchscreen membranes become distorted when exposed to temperatures below 0°C (32°F). The TSC1 controller is not designed to operate below 0°C (32°F).

### *Operation over a wide temperature range*

When used over a wide temperature range, the measured touch position on a touchscreen panel will vary relative to the temperature of both the touchscreen and the TSC1. The absolute difference between the actual touch position and measured touch position will be most prominent in the top right hand corner of the panel for most touchscreen panels (where the X and Y coordinates are largest).

To minimise the positional error associated with temperature change, the touchscreen calibration procedure should ideally be carried out at a temperature in the middle of the temperature range that it is to be used over.

If a touchscreen is expected to be used normally near one extreme of the temperature range, then it makes sense to calibrate when it is at this temperature.

The exact positional error over the full temperature range depends on the touchscreen used. Tests at Arcom have shown that the error due to the temperature of the touchscreen is normally greater than that due to the temperature of the TSC1.

© 2005 Arcom Issue E

## Interference due to RF emissions

The TSC1 resistive touchscreen controller works by driving a potential difference across two sides of the touch panel and then measuring the resulting voltage on another of the panel wires when a touch is made. If used in an area where there are high RF emissions, noise may be induced onto the touchscreen interface cable, resulting in an inaccurate response or even a complete failure of operation.

The backlight inverters used with TFT flat panel displays can be a source of RF interference. It is recommended that the backlight inverter and its cabling be kept as far as possible from the TSC1 and its cabling. The inverter cabling and the TSC1 touchscreen interface cable should not be routed together.

© 2005 Arcom Issue E

# Power supply

## Power input

The TSC1 should be powered from a regulated +5V DC supply (+/- 0.25V). Current consumption of the board is typically 35mA. The polarity of the power input connector is shown on the PCB.

Powering the board with the incorrect polarity or with a voltage greater than 5.25V may damage the board and will invalidate the warranty.

# Appendix A – Contacting Arcom

## Arcom sales

Arcom's sales team is always available to assist you in choosing the board that best meets your requirements. Contact your local sales office or hotline.

***Sales office US***

Arcom
7500W 161st Street
Overland Park
Kansas
66085
USA

Tel: 913 549 1000
Fax: 913 549 1002
E-mail: us-sales@arcom.com

***Sales office Europe***

Arcom
Clifton Road
Cambridge
CB1 7EA
UK

Tel: 01223 411 200
Fax: 01223 410 457
E-mail: euro-sales@arcom.com

Full information about all Arcom products is available on our Web site at www.arcom.com.

While Arcom's sales team can assist you in making your decision, the final choice of boards or systems is solely and wholly the responsibility of the buyer. Arcom's entire liability in respect of the boards or systems is as set out in Arcom's standard terms and conditions of sale. If you intend to write your own low level software, you can start with the source code on the disk supplied. This is example code only to illustrate use on Arcom's products. It has not been commercially tested. No warranty is made in respect of this code and Arcom shall incur no liability whatsoever or howsoever arising from any use made of the code.

## Technical support

Arcom has a team of technical support engineers who can provide assistance if you have any problems with your TSC1 board.

| Technical support US | Technical support Europe |
|---|---|
| Tel:913 549 1010 | Tel:+44 (0)1223 412 428 |
| Fax:913 549 1001 | Fax:+44 (0)1223 403 409 |
| E-mail:us-support@arcom.com | E-mail:euro-support@arcom.com |

# Appendix B – Compatible touchscreens

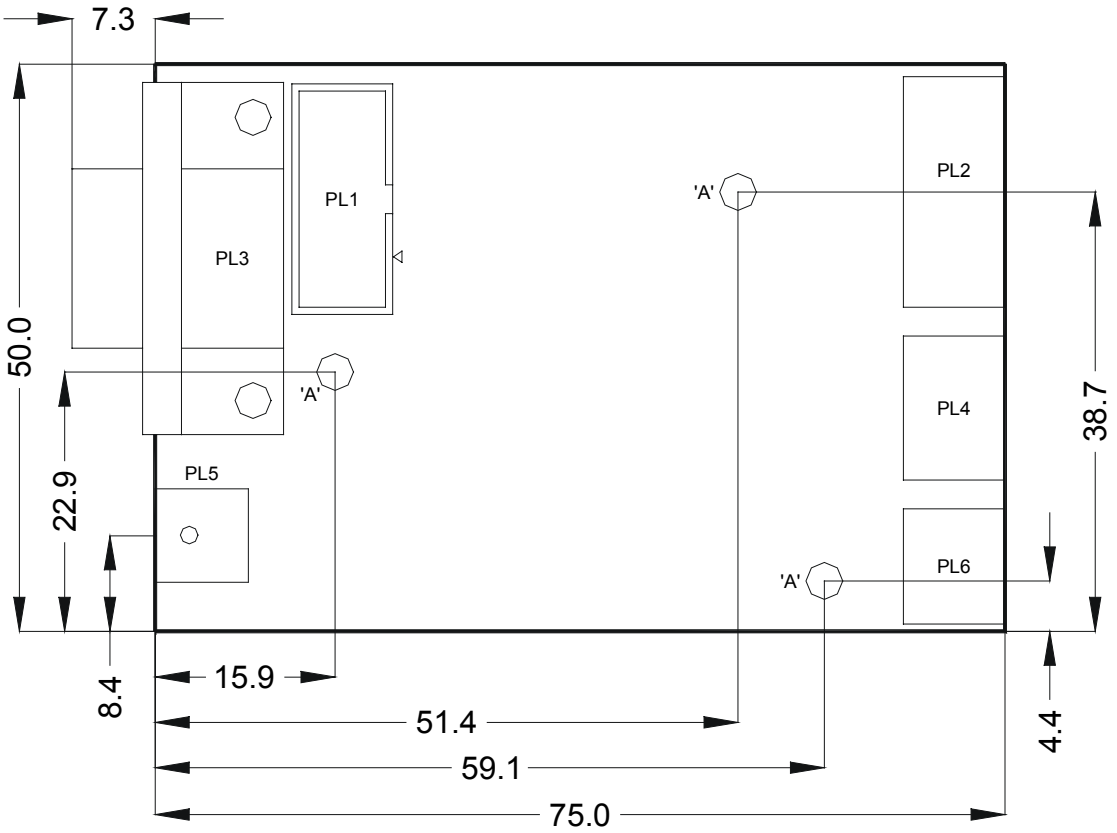
The following table provides a list of some of the resistive touchscreen panels that have been tested with the TSC1:

| Manufacturer | Model number | Number of wires | Panel size | Contact URL |
|---|---|---|---|---|
| 3M Dynapro | DTFP# 95638 | 4 | 6.4" | 3M Touch Systems |
| | DTFP# 95627 | 4 | 10.4" | |
| | RES-15.1-PL8 | 8 | 15.1" | |
| AMT Corp. | 9501 | 4 | 6.4" | AMT |
| ELO | 487669-000 (also called FLT06.4-001-0H0) | 5 | 6.4" | Elo TouchSystems |
| WASP | WSP9724 | 4 | 12.1" | WASP touchscreens |

If you are using a touchscreen panel not on this list and you have difficulty controlling it using the TSC1, please contact the Arcom Technical Support team. See Appendix A – Contacting Arcom, page 28. Please have available the full details of the touchscreen panel, including manufacturer and model number, panel size, number of wires (i.e. 4, 5 or 8), and the panel connector pin-out. Also, please provide details of the TSC1 link settings, the version, issue and mod status of the TSC1, and the version and issue of the TSC1 firmware (printed on the label of IC4 - see TSC1 touchscreen controller ‘at a glance’, page 5).

© 2005 Arcom Issue E

# Appendix C – Dimensional information




BOARD OUTLINE 75.0 X 50.0
ALL DIMENSIONS IN MM
TOLERANCES +/- 0.1 mm

'A' HOLES 3 OFF - 3.25 (128 THOU)

# Appendix D – Reference information

*Product information*

Product notices, updated drivers, support material, 24 hour online ordering:

www.arcom.com

*Touch-Base driver information*

Information about drivers for Microsoft Windows 95/98, Windows NT, Windows 2000 and DOS 6.22 and some evaluation software.

www.touch-base.com

*3M Touch Systems panel*

Information about the touchscreen panel manufactured by 3M Touch Systems:

www.3m.com/us/electronics_mfg/touch_systems/index.jhtml

*AMT Corp touchscreen panel*

Information about the touchscreen panel manufactured by AMT Corp:

www.amtouch.com.tw

*Elo TouchSystems panel*

Information about the touchscreen panel manufactured by Elo TouchSystems:

www.elotouch.com

*WASP touchscreens panel*

Information about the touchscreen panel manufactured by WASP touchscreens:

www.waspswitches.co.uk

© 2005 Arcom Issue E

# Appendix E – Acronyms and abbreviations

| | |
|---|---|
| A/D | Analog to Digital |
| CMOS | Complementary Metal Oxide Semiconductor |
| DC | Direct Current |
| EMC | Electromagnetic Compatibility |
| FCI | Framatome Connectors International |
| IDC | Internet Database Connector |
| LED | Light Emitting Diode |
| MTBF | Mean Time Between Failures |
| PC | Personal Computer |
| PCB | Printed Circuit Board |
| RF | Radio Frequency |
| RS | Recommended Standard |
| RX | Receive |
| TFT | Thin Film Transistor |
| TSC | TouchScreen Controller |
| TX | Transmit |

© 2005 Arcom Issue E

# Index


**1**

10-bit
- drivers · 23
- output · 9
- output mode · 21

**3**

3M · 29, 31

**4**

4-wire touchscreen · 12, 19, 20

**5**

5-wire
- panel · 11
- touchscreen · 18, 20

**8**

8-bit output mode · 21
8-wire
- panel · 10
- touchscreen · 12, 18, 20

**A**

abbreviations · 32
acronyms · 32
AMT · 29, 31
anti-static · 4

**B**

backlight inverters · 26
baud select · 10

**C**

cable · 20, 21
- inverter · 26
- routing · 26
- touchscreen interface · 26

calibration · 24, 25
CMOS · 4
code, source · 28
compatible touchscreens · 29
connectors · 16
- Phoenix · 17

contact details · 28
continuous touch mode · 21
copyright · 2

**D**

dimensional information · 30
disclaimer · 2
drivers · 23
- 10-bit · 23
- Touch-Base · 31
- touchscreen calibration · 24

Dubox · 18, 19

**E**

ELO · 29, 31
EMC · 4

**F**

features · 6

**H**

handshaking · 20

**I**

interfaces · 6
inverter cable · 26


© 2005 Arcom Issue E

**J**

jumpers · 9
  reserved · 9
  settings · 13

**L**

LED · 6
  power · 22
  receive · 22
  transmit · 22
LK1 · 9
LK10 · 12
LK11 · 12
LK2 · 9
LK3 · 10
LK4 · 10
LK5 · 11
LK6 · 11
LK7 · 11
LK8 · 12
LK9 · 11, 12

**M**

mode · 6
  output · 21
  touch · 21
MTBF · 6

**N**

noise reduction · 21, 26
null-modem · 20

**O**

operating
  systems · 23
  temperature · 6, 25
operation mode · 6
output
  mode · 21
  select · 9

**P**

packaging · 4
Phoenix connector · 17
PL1 · 20
PL2 · 18, 20
PL3 · 16, 20
PL4 · 18, 20
PL5 · 17
PL6 · 19, 20
polarity · 27
port
  serial · 16, 20
  serial, alternative · 17
power
  consumption · 6, 27
  input · 6
  input connector · 27
  LED · 22
  supply · 27
product information · 31

**R**

receive LED · 22
returns · 4
RF emissions · 4, 21, 26
RS232 · 6, 20
RS485 · 6
RX · 22

**S**

serial port · 16, 17, 20
signal lines · 20
source code · 28
static · 4
storage temperature · 6, 25
sub-zero temperatures · 25
support, technical · 28
symbols · 7

**T**

technical support · 28
temperature
  operating · 6, 25
  range · 25
  storage · 6, 25
  sub-zero · 25
touch mode · 21
Touch-Base · 23
  drivers · 31
touchscreens, compatible · 29
trade marks · 2
transmit LED · 22
TX · 22

**W**

warranty · 2, 4
WASP · 29, 31
Windows XP · 23

© 2005 Arcom Issue E